



## **Economic Impact Analysis Virginia Department of Planning and Budget**

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### **9 VAC 5-40 – Existing Stationary Sources Department of Environmental Quality December 4, 2000**

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The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 9-6.14:7.1.G of the Administrative Process Act and Executive Order Number 25 (98). Section 9-6.14:7.1.G requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. The analysis presented below represents DPB's best estimate of these economic impacts.

### **Summary of the Proposed Regulation**

The Department of Environmental Quality (DEQ) proposes to add substantive provisions to Article 8 of this regulation, which applies to certain types of large capacity fuel burning equipment that can be classified as electric generating unit (EGU) or non-electric generating unit (Non-EGU). EGUs and Non-EGUs include combustion turbines, industrial boilers, and internal combustion engines. The most significant change to Article 8 is the establishment of specific emission standards for nitrogen oxide (NO<sub>x</sub>) for these types of equipment. The proposed regulation will also remove certain provisions from Article 4, which applies to sources not covered by other rules. Article 4 does not set specific emission standards but is a procedural rule to form the basis for making case-by-case Reasonable Available Control Technology (RACT) determinations. The Environmental Protection Agency's (EPA) disapproval of specified provisions under Article 4 is the impetus for the proposed changes to this article. The proposed substantive changes to this regulation are listed more specifically below:

### Changes under Article 8 (Rule 4-8)

- i-) Adding provisions which establish emission standards for nitrogen oxides from electric generating units and non-electric generating units.
- ii-) Adding provisions for a NO<sub>x</sub> emission compliance demonstration that allow emission rate averaging.
- iii-) Adding provisions for a plan, approved by the Board, that would allow trading between different owners of units and allow the use of banked emissions credits in the NO<sub>x</sub> emissions compliance demonstration.
- iv-) Adding provisions for early reduction credits to be used in the NO<sub>x</sub> emissions compliance plan.

### Changes under Article 4 (Rule 4-4)

- v-) Deleting the provision that pertains to the seasonal applicability of the NO<sub>x</sub> RACT requirements.
- vi-) Deleting provisions that provide an exemption from the RACT requirement for any steam generating unit, process heater or gas turbine with a rated capacity of less than 100,000,000 Btu per hour and any combustion unit with a rated capacity of less than 50,000,000 Btu per hour.
- vii-) Deleting the provisions that provide for an emission allocation system to meet the RACT requirement.

## **Estimated Economic Impact**

### **1. Changes in 9-VAC-5-40, Article 8 (Rule 4-8)**

In addition to this proposed regulation, DEQ has proposed another regulation known as the NO<sub>x</sub> SIP call regulation (Nitrogen Oxides State Implementation Plan call). The proposed additions to Article 8 of this regulation and the NO<sub>x</sub> SIP call regulation are alternatives to each other. If the NO<sub>x</sub> SIP call regulation is adopted in the future, the proposed additions to Article 8 will be removed prior to final adoption. The NO<sub>x</sub> SIP call regulation is based upon a program developed by EPA with the same name. There is uncertainty about the future of NO<sub>x</sub> SIP call,

as its legality is currently being challenged in the U.S. Supreme Court. If NOx SIP call is struck down, then the additions to Article 8 will be kept.<sup>1</sup>

Overall, the proposed amendments to Article 8 are less stringent than the standards under the NOx SIP call. Thus, compared to the costs of emission reductions required by NOx SIP call, the costs of emission reductions under the proposed regulation would likely be considerably lower. EPA has conducted extensive analysis on the costs and benefits of the NOx SIP call program. Data from that research will be reported in this analysis in order to express an estimated upper bound on potential costs due to the enactment of this proposed regulation. In the remainder of this analysis, all quoted monetary values are in terms of 1990 dollars.<sup>2</sup>

### **1.1 Adding provisions which establish emission standards for nitrogen oxides from EGUs and Non-EGUs:**

The proposed regulation reads as follows:

- B. No owner or other person shall cause or permit to be discharged into the atmosphere any nitrogen oxide emissions in excess of 0.25 lb/mmBtu of heat input or 65 percent reduction from 1990 emission rates (lb/mmBtu), whichever is less stringent, from any **electric generating unit**.
- C. No owner or other person shall cause or permit to be discharged into the atmosphere any nitrogen oxide emissions in excess of the levels specified in Table 4-4C of 9 VAC 5-40-311 or 46 percent reduction from 1990 (or another year more representative of normal operating conditions) emission rates (lb/mmBtu), whichever is less stringent, from any **non-electric generating unit**.

The Department of Environmental Quality (DEQ) has emission and heat input records for 1996. According to these records, the 64 EGUs in Virginia emitted 54,539 NOx tons per ozone season in 1996. Some of these sources were operating above the 0.25lb/mmBtu standard and

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<sup>1</sup> Source: Department of Environmental Quality

<sup>2</sup> Inflation adjusted value of a 1990 dollar would be 22.2% higher in the 3<sup>rd</sup> quarter of 2000 as the Gross Domestic Product Implicit Price Deflator was 87.74 in 4<sup>th</sup> quarter of 1990 and was 107.24 in the 3<sup>rd</sup> quarter of 2000. Source: www.economagic.com

some were operating below. The sources operating below the standard could have been credited with NO<sub>x</sub> emissions equal to the difference between the actual emissions and what is required by the 0.25lb/mmBtu standard. The sources operating above the standard would have needed to purchase NO<sub>x</sub> emissions by an amount that is equal to the difference between the actual emissions and what is required by the standard, or reduce emissions to meet the standard, or a combination of both. Given the 54,539 tons of actual NO<sub>x</sub> emissions in 1996, it is estimated that 27,289 tons of NO<sub>x</sub> would have been permitted to be emitted under the 0.25lb/mmBtu standard. This would mean that the EGUs would have been required to reduce NO<sub>x</sub> emissions by 27,250 tons. Under the 65 percent alternative rule, EGUs would be allowed to emit only 19,089 tons of NO<sub>x</sub> which translates into 35,450 tons of reduction in NO<sub>x</sub> emissions. Thus, it is more relevant to use 27,250 tons of NO<sub>x</sub> emission reductions in cost estimates since the 0.25lb/mmBtu standard is less stringent. By using the EPA's estimated cost per ton of NO<sub>x</sub> emissions reduced, combined with the estimated required NO<sub>x</sub> reductions, the cost associated with the proposed new standard can be approximated.

Data provided by DEQ indicates that the 13 Non-EGUs in Virginia that will be subject to these regulations emitted 7,388 NO<sub>x</sub> tons per ozone season in 1996. DEQ indicates that these units would have had to reduce their total NO<sub>x</sub> emissions by about 2,611 tons to have met the standards in 1996.

### **1.1.1 Costs**

#### **1.1.1.1 Electric Generating Units**

##### *Costs to power industry:*

According to EPA research, the cost per ton of Ozone season NO<sub>x</sub> removed is estimated to be \$1,140 and \$1,126 in 2007 and 2010 respectively for the 0.25lb/mmBtu with trading, but also with a cap on emissions. [8] Unlike the NO<sub>x</sub> SIP, the effective proposed provision of this regulation does not have a cap; thus, the actual cost per ton is likely lower than the EPA estimate. Our earlier calculation indicated that if this regulation were in effect in 1996, EGUs would have been required to reduce NO<sub>x</sub> emissions by about 27,250 tons. Based on an EPA projection, it is likely that the required NO<sub>x</sub> emission reductions will be somewhat smaller in future years. Nevertheless, in order to set an estimated upper bound on projected costs to the power industry, the 27,250 figure will be used in calculations for future years. Based on these numbers, the

estimated upper bound for costs to the power industry in Virginia would be about \$31 million ( $\$1,140 \times 27,250$ ) in 2007 and \$30.6 million ( $\$1,126 \times 27,250$ ) in 2010.

*Increasing power prices:*

The EPA analysis of NOx SIP estimated that that program would increase the price of electricity by 1.2% to 1.6%. Equivalently, that would increase the price of electricity by \$0.001 per kWh. [8] Since this proposed regulation is less stringent than NOx SIP, the estimated costs to producers, and costs passed on to consumers in the form of price increases, are not expected to be as great as in NOx SIP. Nevertheless, in order to estimate an upper bound on the potential price increase due to this proposed regulation, the EPA estimated figures will be used.

*Industrial Users of Electricity:*

Electricity is an essential part of most industrial production. Thus, higher electricity prices will increase production costs for most industries. The size of the effect will depend on how much electricity is employed in the production process. In 1994, the manufacturing sector used 0.25 kWh of electricity per dollar output. [8] Based on this ratio and the estimated electricity price increase by EPA for NOx SIP, the average industry is expected to experience at most a 0.03 cent increase in costs per dollar of shipments or 0.05 cent increase for each dollar of value added. [8] Thus, it does not appear that the estimated higher prices are significantly detrimental to industrial users of electricity. This effect is not evenly distributed among all industries, since some industries require proportionally higher electric usage per dollar output. This effect may be better understood if one looks at different industries. As can be seen in Table 1 below, even the industries that proportionally use the most electricity do not experience an increase in production costs exceeding a quarter of one percent.

Industry	Value Added	Value of Shipments
Primary Metals	0.00%	0.09%
Petroleum and Coal Products	0.13%	0.03%
Textile Mill Products	0.12%	0.05%
Stone, Clay, and Glass Products	0.10%	0.05%
Paper and Allied Products	0.09%	0.04%
Chemicals and Allied Products	0.09%	0.05%
All Other Manufacturing	0.03%	0.01%

Source: [8], pp. 6-38.

#### *Household Users of Electricity:*

Similar to industry, households rely on electricity as well. In 1993, an average household used 10,000 kWh. [8] Thus, the EPA projected increase of \$0.001 in electric costs per kWh will consume \$10 from an average household's budget in a year. Keeping in mind that this an upper bound of the estimated impact of this proposed regulation, it does not appear that the increase in cost to consumers for electricity due to this proposed regulation would be cumbersome.

#### **1.1.1.2 Non-electric Generating Units**

These units are industrial boilers, combustion turbines, and other stationary sources. Based on data from the EPA research, and following a similar method described for EGU sources, the upper bound for potential cost to Non-EGU sources is estimated to be about \$3 million.

#### **1.1.1.3 Administrative Costs to State of Virginia**

The proposed regulation will add to the responsibilities of DEQ. To administer this regulation, DEQ will conduct on-going auditing of sources, certification of monitoring plans, and

handling permits. EPA's per unit cost estimates for these activities are \$1,698 for auditing, \$0-\$566 for certification of monitoring plans, and \$115 for permitting, review, and approval of electric generating and non-electric generating units. [8] Moreover, there will be additional administrative costs associated with other units. The total administrative costs will partially depend on the number of units that choose to opt in the standards of the proposed regulation and this creates uncertainty on the total administrative costs.

### 1.1.2 Benefits

Reducing NOx emissions can be beneficial in several ways. Due to data and time limitations, a quantitative estimate of the benefits of the proposed amendments cannot be determined. A qualitative description of the potential benefits follows.

#### *Health Related Benefits:*

A broad range of adverse health effects are associated with exposure to high ozone and particulate matter (PM) levels and NOx emissions play an important role in formation of both ozone and PM. Thus, by reducing NOx emissions, citizens of the Commonwealth may be affected by fewer or less severe health problems.

**Premature Mortality.** Premature mortality has been associated with exposure to high ozone and PM. Reductions in mortality is one of the drivers of the NOx reduction benefits. The mean value of a statistical life is estimated to be \$4.8 million.<sup>3</sup> [9] Both acute exposure (exposure on a given day) and chronic exposure (exposure more than a year) may result in premature mortality. [9]

**Hospital Admissions.** Most people would be willing to pay to avoid hospital admission resulting from NOx emissions. At a minimum, willingness to pay (WTP) to avoid hospital admissions includes the amount of medical expenses. [9] In addition, most people would be willing to pay to avoid pain and suffering associated with illness. Furthermore, to some extent, medical expenses create additional costs to society through subsidized medical insurance.

**Bronchitis, Acute Respiratory Symptoms.** Bronchitis is a morbidity effect of NOx emissions. It can last from the initial stage of the illness to the rest of the patient's life. Respiratory problems associated with NOx emissions including runny or stuffy nose, wet cough, burning,

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<sup>3</sup> Estimates of the value of a statistical life vary between 0.6 and 13.5 million.

aching, red eyes, cough, chest pain, phlegm, and wheeze can occur outside of bronchitis as well. [9] Clearly, the reduction of respiratory problems due to NOx emission reduction would be beneficial.

**Worker Productivity.** Improved ozone air quality has been determined to contribute to worker productivity. This impact is measured by EPA as the change in income in response to change in exposure to ozone. It is found that 10 percent reduction in ozone increases income by 1.4%. [9]

**Minor Restricted Activity Days.** Air pollution associated with NOx emissions may restrict a person's activities as a result of certain symptoms such as eye irritation or a combination of symptoms. [9] The economic value of the removal of restrictions in a certain activities can be considered a benefit.

*Other Benefits:*

Society benefits from the reduced air pollution beyond the health effects already mentioned. These other benefits include positive impacts on plants, animals, structural materials, visibility, and ecosystem functions. [9]

**Commodity Agricultural Crops.** Some commodity crops such as corn, cotton, peanuts, sorghum, soybean, and winter wheat are ozone sensitive. High levels of ozone cause some yield loss for these crops.

**Commercial Forests.** Commercially important mature trees are adversely affected by increasing ozone levels. [9] Thus, the forestry sector is likely to benefit from the NOx emission reductions. The benefits on increased yield of commercial forests due to reduced NOx emissions are likely to appear many years in the future as the harvesting cycle of commercial forests tend to be long and cumulative effects of higher growth rate tends to build up fast.

**Nitrogen Deposition.** Excess amounts of nitrogen load is found to be detrimental to the quality of certain waters. [9] Examples of these adverse effects include brown and red tides, low dissolved oxygen in bottom waters, the loss of submerged aquatic life, and significant shifts in phytoplankton community structure. Reductions in NOx emissions could reduce the incidence and severity of these types of effects. Additionally, reductions in nitrogen deposition from the atmosphere could reduce the need for costly water quality controls.

**Household Soiling Damage.** The Commonwealth will benefit from the reductions of NO<sub>x</sub> emissions as architectural materials and culturally important articles may be aesthetically or structurally damaged by air pollution. [9] Similarly, reductions in NO<sub>x</sub> emissions will reduce the soiling of households caused by PM.

**Visibility.** Residential and recreational visibility has an economic value. People are willing to pay to improve visibility. [9] Thus, higher visibility achieved by reducing the gases and aerosols that scatter, and absorb light will add to the benefits of reduction of NO<sub>x</sub> emissions.

### 1.1.3 Comparison of Costs and Benefits

The estimated upper bound for total costs of this proposed amendment to the EGUs and Non-EGUs is estimated to be approximately \$34 million per year. Part of those costs will be recouped by the power firms by passing costs on to consumers in the form of price increases. DEQ will face additional administrative costs on a much smaller scale. Given the limitations of data and time, a quantitative estimate of the benefits of the proposed amendment cannot be determined. Thus, an accurate estimate of the net benefit cannot be assessed. Nevertheless, it can be said that if the public values the various benefits that result from the NO<sub>x</sub> reductions due to this proposed regulation cumulatively by more than \$34 million per year, than the proposed amendment produces a net benefit.

## 1.2 Adding provisions for a NO<sub>x</sub> emission compliance demonstration that allows emission rate averaging.

If a source's actual emission rate for a unit is below the prescribed rate of .25 lb/mmBtu, it "generates" allowances in an amount equal to the difference between its prescribed and actual rate multiplied by the heat inputs. If the source's actual rate is above the prescribed rate, it must acquire allowances to cover the difference between its prescribed and actual rate multiplied by its actual activity level (heat input). For sources that have more than one unit subject to the prescribed rate, emissions-averaging permits the source to average the emissions between the units.

**Example:** A source has several units subject to the prescribed rate. Some of those units operate below the prescribed rate and some operate above. The units operating below the prescribed rate "generated" allowances that can be used to offset the extra emissions generated

by the units operating above the prescribed rate. Emissions-averaging allows the source to average the emissions among all the units. If the average is at or below the emissions allowed based on the prescribed rate, the source is considered in compliance. If the average is above the amount allowed based upon the prescribed rate, then the source must buy additional allowances within the timeframe identified for the “true-up” period (November 1) or otherwise be considered out of compliance.

Adding this provision will allow sources that have more than one unit to emit at above the 0.25 lb/mmBtu rate at one or more of their units. Thus, the costs of compliance for sources with at least one unit that operates above the prescribed rate will be lower with the averaging provision. On the other hand, since such sources may have otherwise met the standard by reducing their emissions, allowing averaging may result in a smaller total reduction in NOx emissions. This would reduce the total potential benefit of the proposed regulation.

**1.3 Add provisions for a plan, approved by the Board, that would allow trading between different owners of units and allow the use of banked emissions credits in the NOx emissions compliance demonstration.**

For the EGUs in Virginia, it is possible to calculate the potential effects of trading on the amount of NOx emission reductions. For example, EGU units emitted 54,539 tons of NOx in to the Commonwealth air in 1996. If no trading were allowed under .25 lb/mmBtu standard, and sources that operated above the standard instead operated at the standard, total emission would have been 25,534 tons. However, some of the sources with efficient control technologies emitted below the standard. It is estimated from individual emission rates that the efficient control technology firms would have been legally allowed to emit another 1,755 tons of NOx. If trading is not allowed, these sources would not be able to capitalize on their efficient technology by selling 1,755 tons of NOx emission credits to those with inefficient control technologies in need of these credits. Similar mutually beneficial trading opportunities will likely apply to Non-EGUs as well. Note that the actual NOx emissions would increase, but at the same time, the incentives to install efficient control technology would be created.

It should also be noted that transaction costs may deter what otherwise would be mutually beneficial trading of credits between sources that operate below and above the emission standard. If there is uncertainty in whether a source, which believes that its emissions are or will be below

the standard, will have its emission rate approved for credit trading, sources will be less likely to make contracts for emission trading.

Also, it is likely that firms will experience lower emission reduction costs as the size of the emission-trading region is expanded. Thus, by allowing trade across state lines, a higher level of cost efficiency in NO<sub>x</sub> reductions can be achieved as compared to limiting the trade within a state. Under the proposed regulations, interstate trading is allowed with the Board's approval. Thus, depending on the magnitude of transaction costs associated with the Board's approval process, this option may be beneficial to the emission sources.

Banking is another option that affects the potential costs and benefits of this proposed regulation. There are several possible banking methods. For example, banking of emission reductions after the start of the program, banking of early reductions, banking from an earlier phase of the program to a later phase are possible. Any of these banking systems can possibly operate under the proposed regulation provided that the Board approves the banking plan submitted by the sources. Moreover, the proposed regulation allows early reduction credits during 2002 and 2003 and these can be carried over until 2005.<sup>4</sup> In 2004, if the actual emissions are lower than what is required, then these credits can be carried over indefinitely. An emission allowance program with trading and banking can create reductions higher than what is required in one season. This is true because the banking option allows the saving of allowances for use in a later ozone season. The banking option encourages early reductions, provides flexibility for compliance, and reduces costs of compliance. [8]

On the other hand, if the credit bank were to grow large enough, then a sudden surge in the use of banked credits could greatly increase emissions during one ozone season. It is certainly mathematically possible that the unlimited banking of credits could lead to a violation of air quality standards at some point in the future. However, it is not yet known how many credits will be banked or what use patterns will be like. The banking of credits and the use of banked credits should be tracked carefully to ensure that banking does not cause violations of air quality standards or interfere with achieving the required rate of progress in approaching attainment in northern Virginia.

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<sup>4</sup> A detailed discussion on early reduction credits is provided in section 1.4.

#### **1.4 Add provisions for early reduction credits to be used in the NO<sub>x</sub> emissions compliance plan.**

The only way to generate an emission credit is to operate a unit below the prescribed emission rate. Any credits generated can be banked. Early reduction credits (ERC) can be generated during the 2002 and 2003 ozone seasons provided they meet certain requirements. These ERCs are only valid until October 1, 2005, at which time they shall be retired. Any credits generated after the 2003 season may be banked, used in emissions averaging, used in future years, or sold. Note that the ERC option is likely to encourage the sources to start reducing their emissions before 2004 when the compliance must be demonstrated. The ERC option provide incentives to install the control equipment as early as 2002.

#### **2. Changes in 9-VAC-5-40, Article 4 (Rule 4-4)**

The State of Virginia submitted the provisions of Rule 4-4 to EPA for approval. Upon review, EPA did not approve some of the provisions and DEQ is proposing to delete these provisions to be consistent with federal requirements. These provisions are only applicable in “serious” ozone non-attainment areas; currently that is only Northern Virginia. Other areas of the state would not be affected unless they were determined to be non-attainment areas and the state determined that RACT was needed as a control measure in those areas.

If these provisions are not removed, the possible consequences to the Virginia sources affected by this rule would be trying to comply with state and federal rules that are not consistent, and therefore, subjecting themselves to possible violations of the federal rule. The emission standards proposed to be removed were enforced in the past for the sources subject to Article 4. Article 4 applies to sources not covered by other rules, such as fuel-burning equipment or processes. The changes being proposed to Article 4 apply only to sources with potential emissions greater than 50 tons per year of NO<sub>x</sub>. It also only applies to sources for which the state must determine RACT on a case by case basis. Article 4 does not set specific emission limits, but is a procedural rule to form the basis for making case-by-case RACT determinations to reduce emissions. There is one exception to this generality. Section 9 VAC 5-40-311 provides a generic RACT determination for certain types of sources. Those source types may choose to use the generic RACT determination or may request a case-by-case RACT determination.

## **2.1 Delete the provision that pertains to the seasonal applicability of the NO<sub>x</sub> RACT requirements.**

This change is proposed because EPA requires year round applicability. Removal of seasonal applicability will affect Virginia Power only, since it was the only source subject to Rule 4-4 that chose to use the generic RACT determination, and seasonal applicability was allowed only in the generic RACT. All other sources chose to operate under case-by-case determinations of RACT. The removal of the seasonal applicability provision will result in additional required emission reductions from Virginia Power, but those reductions will take place during the colder months and have little or no impact on attainment or maintenance of the ozone air quality standard.<sup>5</sup> Thus, the benefits of this proposed change on ozone air quality are small. However, possible violations of the federal rule will be avoided. On the other hand, Virginia Power will incur costs. Based on the case-by-case RACT determination data, DEQ estimates that the power company will reduce 2,890 tons of NO<sub>x</sub> per year, with approximately 1,200 tons taking place during the ozone season. The associated costs of reducing NO<sub>x</sub> emissions by 1,690 tons outside the ozone season are expected to be relatively small, because most of the cost of the control equipment would have to be spent in any case. The only costs that occur during the remainder of the year and that could have been saved by the use of the seasonal applicability provision are operation and maintenance costs.

## **2.2 Delete provisions that provide an exemption from the RACT requirement for any steam generating unit, process heater, or gas turbine with a rated capacity of less than 100,000,000 Btu per hour and any combustion unit with a rated capacity of less than 50,000,000 Btu per hour.**

The number of plants that would have been exempt if EPA would have accepted the exemptions is 9, and the number of units at these plants is 126, all in the Northern Virginia Area. According to DEQ, most of the options for the RACT determinations made for these units did not involve the installation of control equipment, because it was not economically feasible. Most of the RACT determinations require the sources to (1) perform annual evaluation and adjustment of combustion process; (2) operate according to manufacturer's specifications; (3) utilize proper operation and good combustion practices, etc. These requirements involve minimal costs. In some

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<sup>5</sup> Source: DEQ

cases, the units were replaced by new units that must meet the more restrictive requirement to use best available control technology (BACT). However, the replacement of the units was not done to meet the RACT requirement but done as a separate business decision.<sup>6</sup> Replacement of equipment is an ongoing enterprise by businesses and the use of BACT for new equipment is the standard in such cases. Therefore, the new equipment was already in place or planned to be in place when the RACT determinations were being made. Since meeting the RACT requirement involves minimal costs and the replacement of the equipment is a part of normal business, the costs and NOx reductions are expected to be minimal.

### **2.3 Delete the provisions that provide for an emission allocation system to meet the RACT requirement.**

The emission allocation system is a variation of the emissions trading rule and is one way to average the emission reduction requirements over several units, thus reducing the cost of the compliance. Similar to the other proposed changes under Article 4, this change was necessary because this provision did not meet EPA policy. This particular change will affect only Virginia Power because it is the only facility that opted to use the generic RACT determination and it has several units. By averaging emissions from different units, Virginia Power would have been able to comply with the standards without incurring extra costs. However, DEQ indicates that that would still be the case. Virginia Power is known to have a new non-attainment permit that is more stringent than any RACT determination and, therefore, supercedes any RACT determination. In this case, the cost of meeting the standards by installing new controls should be attributed to the other permit requirements, which is independent from this rulemaking.

## **Businesses and Entities Affected**

Proposed changes in Article 8 will directly affect the 64 electric generating units, and 13 non- electric generating units. As discussed in the Estimated Economic Impact section, proposed changes will effect industries and consumers the Commonwealth who use electricity. Proposed changes under Article 4 will primarily affect Virginia Power. In addition, 9 plants with 126 units will be subject to this article because of the proposed change to the size exemptions.

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<sup>6</sup> Source: DEQ

## **Localities Particularly Affected**

Provisions of Article 8 apply throughout the Commonwealth. Provisions of Article 4 will affect the NO<sub>x</sub> emission units in Northern Virginia since this area is classified as a serious non-attainment area. However, the other areas in Virginia may experience changes in ozone air quality and subsequently be subject to Article 4. In this sense, changes to Article 4 apply throughout the Commonwealth.

## **Projected Impact on Employment**

The proposed amendments to this regulation will likely encourage the reduction in NO<sub>x</sub> emissions. To achieve this result, power companies will have greater incentive to obtain relatively “cleaner” sources of energy. Demand for relatively “dirty” sources of energy, such as coal may decrease. Thus, a small negative impact on employment in the coal mining industry, and the coal transport industry may occur. On the other hand, the natural gas production industry, and the electric generation unit operation industry are expected to enjoy slightly larger employment increases. The net employment in these industries is expected to cumulatively increase by less than 20 jobs.<sup>7</sup> Employment in the operation of air pollution control equipment may temporarily increase by a larger magnitude annually until 2004.

## **Effects on the Use and Value of Private Property**

Efficient NO<sub>x</sub> emission control equipment and the relatively “cleaner” inputs used in power generation, such as natural gas are expected to be used relatively more. Inputs that produce higher levels of NO<sub>x</sub>, such as coal, are expected to be employed relatively less. The profitability, and consequently the value of firms that utilize electric generating units and non-electric generating units that emit NO<sub>x</sub> at rates above the proposed standards, may decline. However, some of these businesses may employ efficient control technologies, and by selling their emission credits, may increase their profitability and their values. The value of businesses that derive their profits from coal and natural gas may experience a small decrease and increase in value, respectively. Finally, the businesses whose value is positively associated with ozone air quality, such as forestry, are expected to enjoy slight value increases.

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<sup>7</sup> Source: analysis in [7] used as an upper limit for possible employment effects of this proposed regulation.

**References:**

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- [8] U.S. Environmental Protection Agency, 1998, "*Regulatory Impact Analysis for the NOx SIP Call, FIP, and Section 126 Petitions*," v1: Costs and Economic Impacts.
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